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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,022	08/01/2003	Dong Il Kim	0001444USU	4727

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EXAMINER

NGUYEN, JIMMY

ART UNIT

PAPER NUMBER

2829

DATE MAILED: 05/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/633,022

Applicant(s)

KIM ET AL.

Examiner

Jimmy Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-13 is/are rejected.
- 7) ☒ Claim(s) 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 0404.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because " the abstract is written in 2 paragraphs ". The examiner is suggest the abstract should be one paragraph.

Correction is required. See MPEP § 608.01(b).

2. Page 14 line 11 " fixing structure 18." is not found. Correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3 – 5 and 9 –13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US 6414501) in view of Rhyu, Dal-Lae (WO 02/15260 A1).

As to claim 1, Kim et al (figure 1) disclose a probe card structure comprising:

Probe sections (figure 1) comprising an insulated circuit board (1) ; probes (2) of silicon material which are formed on the insulated circuit board (1), and are contact with the pad a device to be measured (6,fig 2A) ; and conductive wiring (4) electrically connected to the probes (2) and formed on the insulated circuit board (1);

However, Kim et al are silent on the

Supporting structures which support each of the probe sections;

Fixing structure which fixes the supporting structure together;

Printed circuit which connected to the fixing structure, and is electrically connected to the measurement device transmitting the measurement signals to the device to be measured, and has conductive wiring; and

wiring connection means for electrically connecting the wiring of the probes and the wiring of the printed circuit.

On the other hand, Rhyu, Dal-Lae teaches (fig 3)

Supporting structures (32, glass substrate) which support each of the probe sections (31);

Fixing structure (see the attached drawing highline in yellow) which fixes the supporting structure (32) together;

Printed circuit (35) which connected to the fixing structure (see the attached drawing highline in yellow), and is electrically connected to the measurement device (not shown, but must have in order to transmit the signal from tester to device under test) transmitting the measurement signals to the device to be measured, and has conductive wiring (34, minute wires, page 3 line 31); and

wiring (36, 34, see page 3 line 28 - 31) connection means for electrically connecting the wiring (36) of the probes (31) and the wiring (34) of the printed circuit (35).

It would have been obvious to one having an ordinary skill in the art at the time of the invention was made to modify the structure of Rhye, Dal Lae and use it within the probe section of Kim et al for the benefit of transmitting a testing signal from the tester to device under test and re-transmitting the output signal from device under test to tester to produce a test result.

As to claim 3, Rhyu, Dal-Lae teaches (fig 3) disclose a probe card structure according to claim 1 wherein the wiring (36) of the probe section (31) and the wiring (34) of the printed circuit (35) are electrically connected by a sub printed circuit (33) which can be flexible printed circuit or rigid printed circuit board.

As to claim 4, Rhyu, Dal-Lae teaches (fig 3) disclose a probe card structure according to claim 1 wherein the wiring (36) of the probe section (31) and the wiring of the sub printed circuit (33) are electrically connected by metallic wire formed by the wire bonding method (minute wires, page 3 line 28 – 30).

As to claim 5, Rhyu, Dal-Lae teaches (fig 3) the probe card structure according to Claim 3, wherein the wiring of the probe section (112) and the wiring of the flexible circuit (113) are electrically connected by the anisotropic conducting film (98, page 19 line 2, the anisotropic conducting film connect with the conductive pattern 93 and 97, these conductive pattern is locate within the circuit 113, further these conductive patterns connect with electrical wire on the probe section 112).

As to claim 9, Rhyu, Dal-Lae teaches (figs 4 and 5) disclose a probe card structure according to claim 3 wherein a plating layer (47) is formed on the probe (41) of the probe section (page 8 line 18 – 23) and the wiring (figs 9, 10, plating film 83 is connect to conductive pattern 84, 88 through the space transformer 72 and connect to the probe unit 73).

As to claim 10, Rhyu, Dal-Lae teaches (figs 7F) disclose the probe card structure according to Claim 9 wherein the plating layer is formed by a nickel plating layer or a gold plating layer (page 11, line 19 – 21).

As to claim 11, Rhyu, Dal-Lae teaches (figs 8D – 8F) the probe card structure according to Claim 10 wherein a groove (the pyramid shape of the probe 1006) formed at the tip (1006) of the probes before the plating layer (nickel) is formed (the plating layer nickel 1010 is lay on the tip of the probe contact unit 1009 after the shape of the tip has been formed).

As to claims 12, 13, Rhyu, Dal-Lae teaches (fig 4) the probe card structure according to Claim 1 wherein at least a screw (119) is installed in the support structure (120) and fixing structure (118) to adjust the 3-dimensional locations of the supporting structures and the fixing structures.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US 6414501) in view of Rhyu, Dal-Lae (WO 02/15260 A1) and further in view of Riccioni (US 6198297).

As to claim 2, Kim et al and Rhyu, Dal-Lae disclosed all the limitations as explained in claim 1 above. However, Kim et al and Rhyu, Dal-Lae are silent on the above limitation combine with the probe card structure wherein the supporting structures and the fixing structure are made of one selected from the group consisting of ceramic.

On the other hand, Riccioni teaches the probe card structure (fig 3) wherein the supporting structures (2) and the fixing structure (1) are made of one selected from the group consisting of ceramic (column 3 lines 51 – 59 and column 4 lines 4 - 7).

It would have been obvious to one having an ordinary skill in the art at the time of the invention was made to use the ceramic material to manufacture the fixing structure and support structure to prevent the electrostatic intervention during the testing process.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US 6414501) in view of Rhyu, Dal-Lae (WO 02/15260 A1) and further in view of Ban et al (US 6696849).

As to claim 6, Kim et al and Rhyu, Dal-Lae disclosed all the limitations as explained in claims 1 and 3 above. However, Kim et al and Rhyu, Dal-Lae are silent on the above limitation combine with the probe card structure wherein at least one capacitor is installed to reduce the electric noise on the flexible printed circuit.

On the other hand, Ban et al teach (figs 3 and 5) the probe card structure wherein at least one capacitor (20) is installed to reduce the electric noise (column 13 lines 62 – 67 and column 14 lines 1 – 9) on the flexible printed circuit (16).

It would have been obvious to one having an ordinary skill in the art at the time of the invention was made to install a capacitor of Ban et al in the probe card system of Kim et al and Rhyu, Dal-Lae for the benefit of protecting the variation of power supply and noise (column 13 line 62 – 64 of Ban et al).

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim et al (US 6414501) in view of Rhyu, Dal-Lae (WO 02/15260 A1) and further in view of Whann et al (US 4757256).

As to claim 7, Kim et al and Rhyu, Dal-Lae disclosed all the limitations as explained in claims 1 and 3 above. However, Kim et al and Rhyu, Dal-Lae are silent on the probe card structure, wherein contact pad of the sub printed circuit and the contact pad of the circuit board are electrically connected by pogo pin.

On the other hand, Whann et al teach the probe card structure (fig 5), wherein contact pad (test trace 74) of the sub printed circuit (30c) and the contact pad of the circuit board (test card 30e) are electrically connected by pogo pin (76).

It would have been obvious to one having an ordinary skill in the art at the time of the invention was made to provide the pogo pins to connect both surface of the printed circuit for the benefit of matching the impedance and thereby enabling higher clocking speeds.

Allowable Subject Matter

8. Claim 8 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior arts of record are silent on all the combine limitations of the base claims 1 and 3 and further the probe card structure wherein the contact pad of the sub printed circuit and the contact pad of the circuit board are electrically connected by an perpendicular conductor of silicon rubber material which conducts electricity between top and bottom surface through vertically embedded metallic wires with a diameter of 35micrometer or less, positioned in an array of 0.07-0.45mm matrix. In addition, the

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probe card structure with the metallic wires diameter of 35 micrometer or less and the positioned in array of 0.07- 0.45mm will provide a dense micro probes and therefore it allows more devices to be tested at once.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jimmy Nguyen at (703) 306-5858. Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4900.



JN.

April 28, 2004